Amendments to the Specification:

Please add the following paragraphs after page 12, fourth paragraph:

In accordance with another aspect of the present invention, there is provided an NQR scanner for detecting the presence of a substance containing quadrupole nuclei in a scan volume comprising:

a pulse generator to generate pulse sequences with a frequency at or close to an NQR transition frequency;

a high power RF transmit amplifier for amplifying said pulse sequences;

a high Q, tuneable coil for producing a reasonably uniform magnetic field over the entire scan volume, said coil being part of a resonant circuit in which the resonant frequency can be varied;

an electromagnetic shield to enclose the coil allowing an opening to pass the object into the scan volume for detection, said electromagnetic shield being adapted to stop external interference from entering the scan volume and electromagnetic emissions from escaping from the coil and scan volume;

a tuning subsystem to determine if the introduction of the object into the coil has altered the resonant frequency of the resonant circuit, and to re-tune the resonant circuit close to the required resonant frequency;

a receiver system for amplifying a received signal from the coil after a delay from each transmitted pulse of the pulse sequence;

a processor to process the received signal to separate out the phase or amplitude or both phase and amplitude thereof;

a comparator for comparing the measured amplitude of the received signal with a prescribed threshold; and

a detector to detect weather the measured signal corresponds to an NQR signal emitted by the nuclei of the substance being tested and, if present issue an alarm to alert an operator if the amplitude exceeds the prescribed threshold.

In accordance with another aspect of the present invention, there is provided a method for detecting the presence of a substance containing quadrupole nuclei within an object, comprising:

conveying an object into a scan volume;

determining whether the introduction of the object into the scan volume has altered the resonant frequency for detecting a prescribed substance having quadrupole nuclei within the object;

re-tuning a high Q, tuneable coil to the requisite resonant frequency with the object in the scan volume;

controlledly generating a pulse sequence to excite NQR in the substance if present in the object;

amplifying said pulse sequence to produce sufficient magnetic field strength from the tuneable coil to irradiate the scan volume for detection purposes and cause an NQR transition to a detectable level within the substance if present within the object;

irradiating the entire scan volume reasonably uniformly with a pulsed magnetic field at the requisite resonant frequency created by the application of the amplified pulse sequence to the tuneable coil;

shielding the tuneable coil and scan volume to stop external interference from entering the scan volume and electromagnetic emissions from escaping from the coil and scan volume;

amplifying a received signal from the coil after a delay from each transmitted pulse of the pulse sequence causing irradiation of the object and treating said received signal to improve the SNR;

processing the received signal to separate out the phase or amplitude, or both phase and amplitude thereof;

comparing the measured amplitude of the received signal with a prescribed threshold; and

detecting whether the measured signal corresponds to an NQR signal emitted by the nuclei of the substance being tested, and if present issuing an alarm to alert an operator if the amplitude exceeds the prescribed threshold.

In accordance with another aspect of the present invention, there is provided an NQR scanner for detecting the presence of a substance containing quadrupole nuclei in a scan volume comprising:

means for generating pulse sequences with a frequency at or close to an NQR transition frequency;

means for high power amplifying said pulse sequences for RF transmission;

means for producing a reasonably uniform magnetic field over the entire scan volume;

means for tuning the uniform magnetic field with a high Q to a resonant frequency that can be varied;

means for electromagnetically shielding the magnetic field around the scan volume to stop external interference from entering the scan volume and electromagnetic emissions from escaping from the coil and scan volume, and having an opening to pass the object into the scan volume for detection;

means for determining if the introduction of the object into the coil has altered the resonant frequency to which the magnetic field has been tuned, and to re-tune the magnetic field close to the required resonant frequency;

means for amplifying a received signal from the scanned volume after a delay from each transmitted pulse of the pulse sequence;

means for processing the received signal to separate out the phase or amplitude or both phase and amplitude thereof;

means for comparing the amplitude of the received signal with a prescribed threshold; and

means for alerting an operator if the amplitude exceeds the prescribed threshold.

Please add the following paragraphs after page 13, third paragraph:

Figure 10 shows a single turn sheet coil.

Figure 11 shows a multiple loop coil.

Please amend the first paragraph, page 15, as shown below:

After the tuning has been completed, the high power signal is sent from the diode isolator 4 to the coil 5. As stated in the preceding description, spiral, multi-turn solenoids, and most other coils are not suitable for use in a practical NQR scanner. This leaves few choices for practical NQR scanning. One choice is to use a multiple loop coil, which consists of multiple loops connected in parallel (Fig.~~12~~ 11). This design has the following desirable properties:

Please substitute the attached Abstract, which is set forth on a separate page, for the originally filed Abstract.